

REMARKS

Claims 3, 7-12 and 14-26 are currently pending in this application. Independent claims 7-9 are amended, and new claims 27-29 are added herein.

In the Final Office Action dated November 19, 2203, the Examiner has maintained the earlier rejection of all of pending claims 3, 7-12 and 14-26 under 35 U.S.C. §103(a) as being obvious over the base combination of Chakravorty (U.S. Patent No. 6,181,569) and Honda et al. (U.S. Patent No. 6,181,569), and further in view of Teranuma et al. (U.S. Patent No. 6,392,217), Tsukagoshi et al. (U.S. Patent No. 6,113,728) and Komiyatani et al. (U.S. Patent No. 6,447,915). These rejections were traversed in the Request for Reconsideration submitted by the Applicant on July 28, 2003. For the sake of brevity, the arguments made in the Request for Reconsideration for allowability of the claims are incorporated herein by reference.

Without prejudice to the Applicant's earlier traversal of the Examiner's rejection, independent claims 7-9 are amended herein to further distinguish over the applied references. Specifically each of claims 7-9 is amended to recite that the heating and curing of the sheet encapsulating material is "by application of heat to said semiconductor wafer by a heating apparatus on which said semiconductor wafer is placed to thereby form an encapsulating resin layer" (added language underlined).

In the various embodiments disclosed in the present application, a sheet of encapsulating material is heated by heat that is generated by a heating apparatus after setting the sheet on a semiconductor wafer that has already been placed on the heating apparatus. In other words, the sheet is heated by heat that is applied through the wafer (see, for example, Figure 2 of the application). This method advantageously allows the sheet to be heated and cured gradually, assuring the elimination of voids, and advantageously ensures complete encapsulation without the need for application of pressure (see for example, page 12, lines 12-15, and page 12, line 20 through page 13, line 5).

By contrast, Chakravorty fails to disclose that a sheet of encapsulating material is heated and cured by heat that is generated by a heating apparatus and that is applied through a wafer placed on the heating apparatus, as amended claims 7-9 require. What Chakravorty shows is several encapsulation methods. In one, the wafer is placed in a

mold, and a fluid mold compound is injected into the mold under pressure and cured at an elevated temperature (Chakravorty column 10, lines 8-22). A second method disclosed in Chakravorty involves bonding a dry polymer film, coated with an epoxy adhesive, to a wafer by application of pressure and heat (Chakravorty column 10, lines 28-45). Chakravorty further discloses a third encapsulation method in which a coating of a polymeric film is applied from its liquid solution and then baking the coating dry (Chakravorty column 10, lines 46-65). Each of these methods differs in some material respect, and fails to offer the simplicity of the claimed method.

Honda shows an epoxy resin composition film 2 (Figures 1-3) particularly suitable for bonding a semiconductor chip to a substrate. One typical procedure disclosed in Honda for using the film involves cutting the laminate film to a suitable size, moderately pressing the film to a substrate, mounting a chip on the film, and applying heat and pressure to the assembly (Honda column 12, line 67 through the column 13, line 3). Thus, Honda, like Chakravorty, fails to teach or suggest heating the epoxy resin composition film by heat that is generated by a heating apparatus and is applied through a wafer placed on the heating apparatus.

Teranuma discloses the use of an anisotropic conductive adhesive 5 to bond substrates 1 and 2 together (Teranuma Figure 1). In Teranuma, bonding is performed in an autoclave device upon the application of heat and pressure (Teranuma Figure of 2(c), and column 12, lines 3-12). Teranuma fails to disclose that a sheet of encapsulating material is heated and cured by heat that is generated by a heating apparatus and that is applied through a wafer placed on the heating apparatus, as amended claims 7-9 require. The other cited references, Tsukagoshi and Komiyatani also fail to disclose the claimed method.

In view of the foregoing, it is respectfully submitted that amended claims 7-9, as well as their dependent claims 3, 10-12 and 14-26, patentably distinguish over the applied prior art references, whether considered individually or in combination.

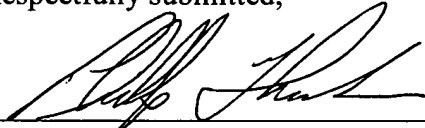
New claims 27-29 are added to recite an additional feature of the method disclosed in the application, namely, preheating the semiconductor wafer by the heating apparatus prior to placing the sheet of encapsulating material over the semiconductor wafer (see, for example, page 12, lines 6-12 and 20-24 Of the application).

In summary, it is respectfully requested that the amended claims be considered and the Examiner's rejections withdrawn. Such action and the passing of this case to issue are earnestly solicited.

Payment in the amount of \$54.00 is submitted with this Amendment for three (3) claims in excess of the 20 claims covered by the RCE fee. Should payment be inadvertently missing or insufficient in amount, please charge any deficiency to our Deposit Account No. 18-0002 and notify the undersigned accordingly.

Respectfully submitted,

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Date


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